

Broad Street Parkway Project Development Guide



Nashua, New Hampshire

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**February 2011
(Exhibit C Project Schedule Updated July, 2011)**

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1.0 Introduction

The Broad Street Parkway is a proposed two-lane arterial roadway connecting Broad Street near Exit 6 of the F. E. Everett Turnpike, with West Hollis Street and Kinsley Street in downtown Nashua (See Exhibit A). This project provides a second crossing of the Nashua River in the downtown area, is designed to provide significant traffic relief to Main Street and Amherst Street, and is expected to facilitate economic development in the Millyard and other underdeveloped downtown areas of the city.

A Final Environmental Impact Statement (FEIS) for an earlier 4-lane project concept was completed in 1997. Over the course of the next several years, New Hampshire Department of Transportation (NHDOT) managed the project as the concept advanced through the design process. By 2002 the design of the project was reported to be 75% complete. In addition, significant portions of the required right-of-way for the project were purchased. However, the City of Nashua determined that the four-lane concept did not satisfactorily address overall impacts to the neighborhoods and the downtown area. Subsequently, the City conducted a re-evaluation of the project. This re-evaluation, called the Terminus Study, led to the City's decision to reduce the four-lane concept to a two-lane concept as well as to implement certain access changes.

In November 2007, the City completed the Broad Street Parkway Supplemental Analysis which refined the engineering, land use and environmental analyses summarized in the Terminus Study. Acknowledging the need to further reduce costs, the City contracted with Nashua Regional Planning Commission (NRPC) to prepare the Broad Street Parkway Evaluation of Cost Reduction Measures completed in July 2008. This study resulted in the elimination of proposed sidewalks and medians from a significant portion of the envisioned project and considered two alignment alternatives (Option 1 and Option 2) for the Parkway south of the Nashua River. Upon review, the City determined Option 2 to be the preferred option. This option ties the proposed parkway into an extension of existing Pine Street.

In 2009 the City contracted with NRPC to conduct a re-evaluation and update of the FEIS documents that were previously completed for the earlier 4-lane concept.

This re-evaluation, completed in October 2010 by NRPC and their consultant Vanasse Hangen Brustlin, Inc. (VHB), included an update of each of the environmental impacts of the project and reconsideration of the various project elements needed to mitigate these impacts.

Review of the subsequent documentation led Federal Highway Administration to issue a revised Record of Decision (ROD) for the project in October 2010.

At the time the revised ROD was issued the design of the project was generally considered to be 15 percent complete.

Hayner/Swanson, Inc. (HSI) has been retained by the City of Nashua to provide professional services in support of the City's management of this project. HSI prepared this Project Development Guide to outline the status of the key project elements and to summarize the City's strategy for implementing final design and construction of the Broad Street Parkway.

2.0 Project Development Elements

The Broad Street Parkway is a complicated project with many varied elements which remain to be addressed during implementation.

Within this section of the Project Development Guide, the current status of key elements is described. Concerns to be addressed as implementation of the project proceeds are discussed and conclusions presented for incorporation of the resolution of these concerns into the overall project strategy.

Elements discussed in this section include:

- Roadway Design
- Bridge Design
- Stormwater Management
- Wetland and Shoreland Impacts
- Hazardous Materials and Subsurface Contamination
- Impacts to Cultural/Historic Resources
- Utility Coordination
- Right-of-Way Acquisition
- Base Survey

2.1 Roadway Design

2.1.1 Parkway

Generally the horizontal alignment of the Parkway has been established although some refinement will occur during Final Design.

A preliminary vertical alignment has been established for purposes of identifying various impacts during the Environmental Re-Evaluation. It is anticipated that refinement of this vertical alignment will be performed during Final Design with the goal of further minimizing impacts.

The Parkway typical section upon which the Environmental Re-Evaluation is based includes 12-foot travel lanes. North of the Nashua River, 8-foot wide shoulders (without curbing) will be used. On the river bridge and south of the river, 5-foot wide shoulders with curbing will be used. Use of narrower shoulders may be considered during final design.

In order to encourage appropriate driving speeds and reduce project costs, consideration will be given to reducing the width of travel lanes to 11-feet throughout the project.

2.1.2 Pine Street and Palm Street

The project includes changes to traffic patterns on Pine Street and Palm Street. Following construction, Pine Street will operate as a one-way street southbound from Central Street to Kinsley Street.

Palm Street will operate as a one-way street northbound from Kinsley Street to Central Street.

Palm Street will be realigned to remove an existing discontinuity of the roadway through the intersection with West Hollis Street.

In addition to the overall traffic operation benefits demonstrated by analysis performed by NRPC, consideration will be given to the feasibility that some improvements to the layout of sidewalk facilities can be incorporated within the limits of work on Pine Street and Palm Street.

The extent of possible widening and improvement to existing sidewalks, as well as opportunities for traffic calming, will be identified and refined as final design proceeds. It is noted that the determination of the layout and width of roadway and sidewalk in this dense urban neighborhood will require balancing numerous conflicting design goals. The goal of widening sidewalks may conflict with the desire to maintain on-street parking to the extent possible. The goal of processing through traffic may conflict with the goal of controlling speed in this residential neighborhood.

It is noted that with this change to traffic patterns, the implications to truck access to the Millyard and Parkway will need to be considered in setting the final layout of curbing, particularly at the intersection of Palm Street with Central Street.

Trucks traveling northerly from West Hollis Street will no longer be able to use the current two-way configuration of Pine Street to access the Millyard from West Hollis Street. Instead trucks will use Palm Street to Central Street, where a left turn will access the intersection with Pine Street and the Parkway. Providing an adequate turning radius for this movement will require widening of Central Street to the north.

Final Design of the improvements to Pine Street and Palm Street are underway and construction is anticipated to begin in Fall 2011.

2.1.3 Fairmount Street and Baldwin Street

A conceptual design has been prepared for these roadways. Following final determination of the vertical clearance that will be required over the railroad located beneath the proposed bridges on both roads, all elements (horizontal alignment; vertical alignment; and typical sections) will be re-evaluated in an effort to minimize impacts to private property.

2.1.4 Broad Street

A preliminary design has been prepared for the intersection of the Parkway with existing Broad Street.

During Final Design, traffic operations and the preliminary geometric layout will be reviewed and refined.

2.1.5 Drive Access

Two potential access points to the Parkway north of the Nashua River are under consideration. One is in the area of the former Fimbel Door property. This access point is intended to serve potential development of adjacent privately owned land.

The second potential access point north of the Nashua River would allow for possible connection with Main Street by tying into existing Franklin Street.

These two access points are conceptual only. The Broad Street Parkway project as presently envisioned does not include construction of these access points and associated roads. If it is determined that these connections are desirable, design and construction will occur under a separate effort.

Three access points are anticipated within the Nashua Millyard. Two of these access points would serve Millyard businesses west of the Parkway and one would serve businesses and residents east of the Parkway.

These access points within the Millyard also have been designed at a conceptual level. It is important to note that during the future final design phase, a number of concerns will need to be coordinated carefully with local stakeholders to assure that the layout of access within the Millyard best meets their needs. Impacts to existing circulation, parking, access to loading docks, and Parkway traffic operations will all need to be considered.

2.1.6 Sidewalk Design

The Broad Street Parkway design that was described in the 1997 FEIS as the selected alternative included a proposed sidewalk along the entire length. The proposed sidewalk north of the Nashua River was intended to be wide enough to serve as a multi-use trail for both pedestrians and bicyclists.

During the evaluation of cost reduction measures, it was determined that project development would proceed without a proposed sidewalk between Broad Street and the connection with existing Pine Street. Existing sidewalk locations would be retained, but new enhancements would not be constructed unless additional funding sources were obtained.

In order to provide bicycle functionality, roadway shoulders will be widened along the length of the Parkway. Minimum shoulder width of 5-feet is anticipated.

Although the new sidewalk is not proposed to be constructed in the Parkway project, provisions will be included during acquisition of the Right-of-Way corridor to facilitate future construction of a sidewalk should funding become available.

Recently it was announced that Nashua will receive a grant of approximately \$480,000 to be used for sidewalk construction along the Parkway.

This grant provides funding for a critically important sidewalk link. The project as envisioned following the study of cost reduction alternatives included a bridge over the Nashua River that would be too narrow to add sidewalk in the future. By providing needed funds to construct a wider bridge over the Nashua River, this grant will allow the City to extend the proposed sidewalk to the north side of the river. The sidewalk is anticipated to tie into existing ground in the area near the northerly bank of the Nashua River. Should future funding become available, this sidewalk could someday be extended to Broad Street.

2.1.7 Roadway Design - Conclusions

It is anticipated that design of the Parkway will be straight forward north of the Nashua River once a final determination on the roadway typical section is made.

South of the Nashua River, final design will be complicated by the need to reach a final determination for the layout of tie-ins to the existing Millyard access road and parking lot layout.

The coordination effort presently underway with the Millyard Association will be continued in order to finalize this critical concern.

Construction of the improvements to the Tree Streets has been identified as an early priority. Final design of these improvements is underway.

2.2 Bridge Design

Basic horizontal and vertical constraints relating to bridge design have been identified and a conceptual layout prepared.

As design proceeds several concerns will need to be addressed. These concerns include:

- The Nashua River is a prime wetland. The permitting process will be significant.
- Study of river hydraulics and floodplain impacts will need to be refined early in the design process.
- The northerly abutment of this bridge will tie into proposed retaining walls. Construction of these walls will require relocation or protection of a critical sewer interceptor.
- Consideration of the staging area that will be needed for the contractor's operations will be an important consideration as the final limits of property and easement acquisition is determined.
- Use of design/build as the project delivery method for construction of the three bridges is under consideration.

2.2.1 Bridge Design-Conclusions

It is anticipated that a study of river hydraulics will be performed in advance of the final design effort.

An early design effort will be completed in order to facilitate the final determination of whether the bridges will be constructed using a design/build project delivery method.

An alternatives analysis will be necessary to determine whether protection of the existing sewer interceptor or relocation is the preferred solution.

A comprehensive coordination effort with the owners of the railroad will proceed in advance of the design in order to avoid or minimize delay as concerns are resolved.

Impacts to several types of resources are highlighted because of the significant effort that will be required to mitigate associated impacts. These highlighted impacts include:

- Hazardous Materials and Subsurface Contamination
- Stormwater Management
- Wetland Impacts
- Cultural Resources

2.3 Stormwater Management

Stormwater management standards and requirements have evolved significantly since the Record of Decision was issued for the 1997 FEIS.

The Broad Street Parkway project will be required to comply with updated NHDES requirements including changes to Alteration of Terrain permitting that significantly increase the requirements for qualitative and quantitative treatment measures and consequently cost of managing stormwater and maintaining run-off water quality.

The overall strategy for stormwater management has been updated as part of the Environmental Re-Evaluation completed by NRPC on behalf of the City of Nashua.

Cost factors have been included in the overall project budget to address stormwater management. The cost factors are based on costs incurred on other projects of similar magnitude. Stormwater management is not anticipated to cause unforeseen schedule delays.

The right-of-way limits previously defined are anticipated to be sufficient to allow for stormwater management facilities. However, additional design development and further coordination with NHDES must occur before final right-of-way limits can be set in certain areas.

Early action is recommended to further develop the overall stormwater management strategy in coordination with NHDES. Until the overall strategy is developed to a point where general agreement can be reached with reviewing authorities, the potential implications to project budget and schedule remain unknown.

2.4 Wetland and Shoreland Impacts

When the 1997 FEIS was prepared, wetland impacts were not anticipated to be a concern even though the project impacts several areas where standing water is present some or all of the time. It was determined that these areas did not meet the regulatory requirements for classification as wetlands. The Environmental Re-Evaluation completed by NRPC on behalf of the City of Nashua includes a review of these earlier conclusions. As described in the Re-Evaluation Report, several of these areas are now considered to meet the requirements to be identified as wetland

communities.

In addition, the work to construct the bridge pier(s) for the new river bridge crossing will impact the Nashua River. This river is a prime wetland. The effort to permit this construction, including temporary construction impacts, is anticipated to take 6 to 8 months once design plans have been prepared.

Proposed work in the canal will also require permitting for wetland impacts.

It is also noted that the project will be subject to review and approval related to the Comprehensive Shoreland Protection Act (CSPA). Although a portion of downtown Nashua falls within the zone where a waiver was recently granted, the Parkway project includes impacts that fall outside of this waiver zone and therefore filing an application will be required for the shoreland protection permit.

It is recommended that efforts to develop the design plans needed to support the wetland and shoreland protection permitting filings be prepared and submitted as soon as practical.

2.5 Hazardous Materials and Subsurface Contamination

The Broad Street Parkway will have short-term impacts associated with the presence of hazardous materials within the proposed limits of work.

Materials that will be encountered include asbestos containing material within buildings that will be demolished, as well as asbestos containing material buried at several locations within the project limits. Other subsurface contaminants have been identified, including (but not limited to) various petroleum products from several past spills and leaks in above ground and underground tanks.

During preparation of the 1997 FEIS, as well as during the NHDOT managed design effort for the FEIS preferred alternative, various investigations and studies were performed to characterize and identify limits of hazardous materials.

Recently the City of Nashua and HSI held coordination meetings with NHDOT in part to determine the status and results of these investigations and studies. This effort is ongoing.

The effort that will be needed to complete the studies and determine steps that will be required by the New Hampshire Department of Environmental Services (NHDES) to remediate hazardous materials encountered during construction is unknown at this time. Subsequently, the extent to which remediation of hazardous materials will affect the overall budget and project schedule is also unknown at this time.

It is recommended that the City retain the services of a qualified firm to review work to date, complete needed studies, and support the City's effort to coordinate with NHDES to define the extent of remedial activities that will be required. Because of the associated consequences to budget and schedule, it is further recommended that this project-wide environmental program be

undertaken as an early action task.

2.6 Impacts to Cultural/Historic Resources

A Memorandum of Agreement (MOA) has been executed between FHWA; New Hampshire State Historic Preservation Office (NHSPO); NHDOT; and the City of Nashua. This MOA is included in Appendix G of the NEPA Environmental Re-Evaluation Report. This MOA outlines impacts and mitigation commitments.

2.6.1 Boiler House

Construction of the Broad Street Parkway requires demolition of the Millyard Boiler House. Demolition of this building is complicated by the presence of extensive asbestos containing material, as well as soil contaminated by leaking fuel tanks contained within the structure.

Remnants of a partially demolished storage tank nearby and mitigation of associated soil contamination are anticipated to be performed concurrent with cleanup and demolition of the Boiler House.

While the Boiler House will be demolished, an adjacent building which shares a wall with the Boiler House will not be demolished. Because the building to be retained predates the building to be demolished, it is anticipated that the effort to maintain the common wall will be straight forward. Because of the extent of contamination within the Boiler House, architectural design professionals were unable to access the interior of the building.

Complicating demolition of the Boiler House is the presence of a pump within the building which is an integral part of the fire protection system for the Millyard. Haley and Ward, Inc. have been retained by the City to conduct a study of this pump and evaluate options for replacing this pumping capacity.

The contract documents for the Boiler House demolition include provisions to retain the portion of the building where this pump is located.

This pump will be removed during a later construction contract after the replacement pumping system is installed at another location (to be determined).

Following review of the contract documents for the proposed demolition in December 2010, NHDOT recommended that additional testing be performed of materials within the building in order to better identify the scope of work for bidders and reduce the likelihood and subsequent magnitude of potential change orders during construction.

This additional site work and testing was performed in early January and the results are being incorporated into bid documents. Following receipt of the revised documents, NHDOT; NHDES; FHWA and the City will undertake a comprehensive review of the bid and contract documents for this complicated demolition and environmental mitigation project.

2.6.2 Boiler House Chimney

The Boiler House Chimney was evaluated in 1998 by Boston Chimney and Tower Company of Peabody, MA. At that time recommendations for various repairs included reconstruction of the top 20 feet; re-pointing of masonry joints; removal of an interior brick lining; treatment with a sealant; repainting the letters which spell “MILLYARD”; and construction of a new weather-tight concrete cap.

In May 2010, Boston Chimney and Tower Company updated their 1998 survey and report. Conclusions from this update indicate that the list of improvements previously recommended in 1998 remain unchanged.

The City has determined that demolition of the adjacent Boiler House will occur prior to restoration of the chimney. However, in order to address concerns noted by Boston Chimney regarding the condition of the top 20-feet of the chimney prior to demolition of the Boiler House, an early contract will be undertaken to remove this section of the chimney. Following demolition of the Boiler House, this section will be reconstructed during other restoration work.

In addition, the City has identified the need for a structural engineer to perform an analysis of the structure prior to undertaking the restoration recommendations. The effort to contract with a structural engineer to undertake this analysis is underway.

2.6.3 Waste House

The Millyard Waste House is a small (approximately 40 foot by 70 foot) brick building (with brick foundation) located in the path of the proposed Parkway. During review of the various impacts to historic resources, the New Hampshire Department of Historic Resources (NHDHR) requested that Nashua review the feasibility of relocation of this building to another location within the Millyard.

A preliminary concept for relocation of this building has been considered. Several contractors have been contacted to discuss the feasibility of moving this existing brick building. On the basis of the experience cited by contractors, it appears that the building can be moved.

The City has committed to perform further studies to confirm the preliminary conclusion that relocation of the Waste House is feasible and reasonable. Assuming positive results of these studies, the Waste House will be relocated to a new location within the Millyard.

2.6.4 Storehouse Number 2

The former Millyard Storehouse Number 2 is a long brick building immediately adjacent to the Nashua Canal. Gate City Fence occupies most of the space within the building and owns the entire building. A portion of the building is leased to a local church.

The project will impact the northernmost end of the building. This impact coincides with the location of the church. This portion of the building will be removed to allow for construction of the Parkway, as well as providing space that could be used for a limited number of parking spaces that will serve the northerly end of this building.

Designing the retrofit of this building will require the services of a qualified architect who has a background in historic structures. Designing appropriate treatment of new exterior end wall will be an important feature.

2.6.5 Granite Retaining Wall at the Nashua River

Construction of the Nashua River Bridge will result in impact to a granite slab retaining wall on the northerly side of the Nashua River. The extent of mitigation required includes documentation of preconstruction conditions as well as consideration of options for reuse of granite slabs that will be removed to facilitate construction.

2.6.6 Nashua Canal

The project will involve several impacts to the Canal near Pine Street. The project will require construction of a new retaining wall and placement of fill within the Canal to support a portion of the Parkway. An existing stormwater structure that maintains the elevation of the impounded water in the canal will need to be reconstructed at the location of the new wall, and an intake to the Millyard fire protection system may need to be relocated or modified.

2.6.7 Other Mitigation Commitments

As described in the MOA, other commitments have been made to mitigate impacts to cultural/historic resources. Several are described herein. Reference is made to the MOA for a complete listing.

The existing trestles for the Baldwin Street and Fairmount Street bridges will be marketed with covenants for alternative use. A study of the historic context of these wood trestles will also be prepared.

A commitment has been made to document numerous buildings which will be subject to full or partial demolition.

Brick, stone and other architectural elements will be reused within the project limits to the extent practical.

A portion of the project falls outside the project limits studied during design development of the previous 4-lane concept. A preliminary archeological assessment has been performed in this area (in the vicinity of Pine Street Extension). All appropriate phases of archeological investigations will be undertaken in sensitive areas within the Nashua Manufacturing Company Historic District.

2.7 Utility Coordination

A key aspect in the development of the Broad Street Parkway is the ongoing coordination with the owners of private utilities in order to identify and resolve conflicts between the new work and existing utility facilities. Coordination with utilities is a complicated and time-consuming effort. However, diligent coordination efforts can greatly reduce the risk of later schedule delays and

cost overruns related to utility impacts.

Generally when private utilities are located within an established right-of-way, utilities are expected to perform required relocations at the utility owner's expense with no reimbursement. However, when the relocations are required in an area where a new right-of-way is being established, utility owners often expect to be reimbursed for the associated costs. Much of the Parkway project falls within a new right-of-way. With respect to utility impacts, this may be particularly sensitive within the Millyard area where there are many utility facilities providing service to numerous businesses.

The City and HSI have met with NHDOT to summarize utility coordination efforts to date. In general, efforts have been made to identify existing utility facilities throughout the corridor. It is noted that this identification relies on record plans which may be incomplete or inaccurate.

The City has held recent meetings with NHDOT as well as Pennichuck Water Works (water); Public Service of New Hampshire (power); Fairpoint Communications (telephone) and National Grid (gas).

Early utility coordination and Parkway project priorities were discussed:

Pennichuck Water Works- 2011 priorities include possible replacement of water pipe within the limits of the Pine Street and Palm Street contract as well as upgrades that may be needed to facilitate replacement of the fire protection system pump presently located in the Boiler House. Replacement of water pipes at Baldwin Street and Fairmount Street is anticipated in 2012.

Public Service of New Hampshire (PSNH) - Relocation of poles in the vicinity of the Boiler House as well as any relocation that may be necessary for the Pine Street and Palm Street contract are early priorities.

Fairpoint Communication- Because the poles used by both PSNH and Fairpoint Communication located south of the river are owned by PSNH, the lead in relocation needed for early contracts will be PSNH.

Fairpoint owns the poles north of the river where key priorities will include relocation that will be necessary for proposed widening of Broad Street in the area of the new signalized intersection with the Parkway as well as any relocation necessary at Baldwin and Fairmount Streets.

National Grid- Early priorities include any replacement or upgrade of existing facilities within the limits of the Pine Street and Palm Street contract. Later priorities include work needed at Broad Street, Baldwin Street and Fairmount Street.

The City is reviewing the condition of city owned sanitary sewer within the limits of the Pine Street and Palm Street contract as well as whether a new sewer main should be constructed within the limits of the Parkway from the intersection with Central Street to the area near the proposed river crossing.

Coordination will also be needed with other utilities including cable television and fire alarm.

2.8 Right-of-Way Acquisition

With the change from the FEIS 4-lane concept to the 2-lane concept, the property needed for the right-of-way has changed as well. Some property that was previously identified as needed is no longer required. Several parcels that were not previously identified are now needed for the revised alignment.

Of the parcels identified as being needed (either entirely, or partially) for the Broad Street Parkway, 26 have been acquired.

Of the parcels identified as needed for FEIS 4-lane concept, but not yet acquired, a total of 6 (out of 14) are still needed for the preferred 2-lane concept (Option 2).

Among the property needed to establish the Parkway Right-of-Way is a partial acquisition of land owned by Pan Am Railways.

An additional 8 parcels not previously identified will be needed (either entirely or partially) to complete the preferred 2-lane concept.

In addition, minor strip takings will be needed at numerous locations immediately adjacent to the new construction. The specific locations and area requirements will be identified during final design.

The agreement between NHDOT and the City of Nashua regarding management of the Broad Street Parkway states that NHDOT shall manage the right-of-way acquisition.

Representative of the City and HSI have held several coordination meetings with NHDOT to discuss the status and process for right-of-way acquisition.

The process NHDOT typically follows includes the following steps:

1. Right-of-way plans are provided to NHDOT Bureau of Right-of-Way. These plans show existing topographic detail, existing property lines, the proposed construction, the proposed limits for the new right-of-way as well as any easements required.
2. Bureau of Right-of-Way staff (or outside consultants working for the Bureau) initiate the abstracting process. Deeds are researched. Existing easements are identified, and any liens or encumbrances noted.
3. Professional appraisers prepare an appraisal of the value of the property.
4. The appraisal is reviewed independently.
5. An offer is prepared and submitted to the property owner. If agreement can be reached, the acquisition proceeds to closing. If an agreement cannot be reached, the Bureau initiates a condemnation process to take the property.

Typically this process starts when a project has progressed to a 70 to 75 percent stage of design

completion. At this stage, the location of drainage facilities would be identified and sized, and impacts due to construction (including slopes adjacent to proposed roadways and sidewalks) would be defined sufficiently for purposes of acquiring right of way.

Typically for large projects such as the Broad Street Parkway, this acquisition process takes between 18 and 24 months to complete after the process is initiated.

A review of the overall project schedule indicates that right-of-way acquisition for this project cannot follow the typical process and still maintain critical schedule milestones.

For this reason, the City and NHDOT have formulated a strategy to accelerate the acquisition of right-of-way.

A number of parcels have been identified as high priorities for acquisition. Acquiring these parcels early will support early construction activities. As design proceeds the City will review and update the status of various acquisitions. As the design is refined in various locations, the City will have Right-of-Way plans prepared for individual parcels.

2.9 Base Survey

During the NHDOT managed design of the FEIS 4-lane concept, a survey base plan was developed from aerial survey supplemented by ground survey at locations where the new roadway was proposed to tie into the existing roadways.

This base sheet was developed in accordance with NHDOT standards of the time which called for compatibility with GDS CADD software.

Present NHDOT policy calls for use of MicroStation software in plan development of NHDOT projects. Municipally managed projects are typically prepared using AutoCAD software because this is the software used by most cities and towns in New Hampshire including Nashua.

The conceptual design efforts performed as part of the Environmental Re-Evaluation were done in MicroStation. These files were converted from the enhanced aerial survey basesheet files created in the late 1990's for the NHDOT managed 4-lane design.

Option 2, the City's preferred 2-lane option follows a route that differs from the 4-lane concept. Topographic survey has been performed for areas south of the Nashua River that fall outside the limit of the 4-lane concept base-plan.

Prior to initiation of final design, two survey related questions remain to be resolved.

The first question is whether the design will proceed in MicroStation or AutoCAD. Because this project will be owned and managed by the City of Nashua, it is recommended that design proceed using AutoCAD Software. The effort to implement this change will be relatively minor if this decision is made prior to the start of final design.

The second question is whether new ground survey should be performed project-wide.

It is understood that the 1997 aerial survey with one-foot contour interval was specified to have standard map accuracy (+/- one half contour) of approximately 6-inches for elevations on this project. While this level of accuracy may be considered adequate for some project areas, greater accuracy is needed at other areas such as within the Millyard, which were not previously surveyed using ground topographic methods.

The 4-lane concept called for creation of a new access road within the Millyard. With this concept, grades were not as critical as with the new 2-lane options. In the new option, new road work is minimized and the tie-ins to the Parkway will be more sensitive to inaccuracy in surveyed information.

In some project areas, notably along Broad Street, construction has changed features, details, and grading since the 1997 survey was performed.

For these reasons it is recommended that a complete review be performed of the basis of survey (aerial or ground) project-wide. Following this review, the extent to which new topographic survey will be performed can be identified.

When these limits are reviewed, consideration should be given to whether it is advisable to simply fill in the remaining gaps or obtain sufficient survey, so the entire mapping for the project is based on ground survey.

It is noted that work recently completed to survey property lines throughout the corridor will simplify the effort for obtaining new topographic survey, whether at specific locations, or project-wide because survey control has been established throughout the corridor.

3.0 Construction Contracting

3.1 Current Status - Contracting Strategy

Central to the overall strategy for project development are two questions pertaining to contracting.

The first question relates to how many construction contracts will be used. The second question has to do with the form of contracting and design development. Will contracts be procured using the traditional design/bid/build process, or will contracts be procured as design/build contracts?

3.2 Number of Contracts

Various alternatives for the number of construction contracts have been considered from use of a single large contract to breaking the work into a number of smaller contracts.

For purposes of planning, the project has been divided into 11 portions (See exhibit B), each of which could be constructed as an independent contract. The intent is not necessarily to construct the parkway using these 11 construction contracts but rather to use these possible contracts as a basis for determining critical paths, interrelationships, and relative costs for these different

segments. This analysis was performed to serve as a decision support tool to help in the determination of the actual number of contracts that will be used to complete construction of this project.

A summary of the 11 possible contracts follows:

3.2.1 Contract 1- Pine Street and Palm Street

Contract Limits:

This contract includes reconstruction of roadway and sidewalks on Pine Street and Palm Street between Central Street and Kinsley Street.

The work includes signal and streetscape improvements.

Construction Budget: \$2,200,000 (*2011 Dollars*)

Notes:

One partial acquisition remains to be completed. Truck turning movements from Palm Street onto Central Street must be considered in setting final contract limits. Existing utility facilities including a cabinet owned by Fairpoint may present constraints to be addressed during design.

Overall impacts to on-street and off-street parking are to be evaluated.

Condition of existing sewer and drain systems are to be considered to determine if the contract should include reconstruction of pipelines and structures.

Coordination is needed with private utility owners. This contract has been identified as an early priority.

Preceding Parkway Contracts:

No other Broad Street Parkway construction is needed before this work can start.

3.2.2 Contract 2-Chimney Rehabilitation

Contract Limits:

This contract includes implementation of recommendations by Boston Chimney & Tower Company, Inc., Peabody, MA

Construction Budget: \$600,000 (2011 Dollars)

Notes:

Condition survey and assessment was performed by Boston Chimney & Tower in 1998. No restorative action has been performed since this assessment.

The condition assessment was updated in May 2010. Recommendations for restoration remain unchanged.

Preceding Parkway Contracts:

An early effort to remove the top 20-feet of the chimney is anticipated to begin in January 2011 with completion in February 2011.

Remainder of the work to be performed after the Boiler House Demolition.

3.2.3 Contract 3-Boiler House Demolition

Contract Limits:

This contract includes demolition of the Boiler House and associated remediation of asbestos and contaminated soil.

The remediation will include materials contained within the Boiler House as well as within the limits of Parkway construction between the Boiler House and the River.

Construction Budget \$2,500,000 (2011 Dollars)

Notes:

Credere Associates has performed an investigation and analysis associated with remediation and is completing bid and contract documents.

Pumps are housed in the Boiler House which is part of the Millyard Association owned fire protection system. The functionality of these pumps must be maintained either by relocation of the pumps to a new location, or construction of a new water main capable of feeding building fire protection systems.

An adjacent building (location of Keystone Hall) is to remain. This building shares a common wall with the Boiler House.

Preceding Parkway Contracts:

Removal of the top 20-feet of the adjacent chimney must be removed prior to demolition of this building.

3.2.4 Contract 4- Canal Control Structure

Contract Limits:

This contract includes construction of a new canal wall and a new canal flow control structure.

Construction Budget: \$246,000 (2011 Dollars)

Notes:

The feasibility of re-use of granite blocks from the existing canal wall for facing the new wall will be evaluated.

The work may impact the inlet to the Millyard Association owned fire protection system. Limits to be determined during final design.

Preceding Parkway Contracts:

Depending on resolution of concerns related to the fire protection system inlet, work in Contract 3-Boiler House Building Demolition may have to precede work related to relocation of the fire protection pump from the Boiler House to a location to be determined may have to precede work on Contract 4.

3.2.5 Contract 5- Waste House Relocation

Contract Limits:

This contract includes all work associated with moving the existing brick Waste House to a new location.

Work includes construction of a new concrete foundation. Surplus bricks will be used to face the foundation.

Construction Budget: \$500,000 (2011 Dollars)

Notes:

Further study is needed prior to final determination of feasibility and limits of this contract.

Work will include restoration of utility service connections.

An architectural evaluation will be needed to determine design details.

This work is anticipated to be part of the mitigation for impacts to cultural resources.

Preceding Parkway Contacts:

The following contracts must be completed prior to work on this contract:

Contract 2 Chimney Rehabilitation

Contract 3 Boiler House Demolition

3.2.6 Contract 6- Storehouse Number 2

Contract Limits:

This contract includes all work associated with modifications necessary to remove approximately 220 feet of the length of this building.

The work includes construction of a new end wall consistent in style and appearance with the remainder of this historic structure.

Construction Budget: \$450,000

Notes: Property must be acquired prior to construction. This will be a partial acquisition of the parcel.

No inspections or evaluations of this building have been made. Evaluation of structural integrity, review for asbestos containing material and existing building utility services must be considered.

The portion of the building to be acquired and removed presently houses a church.

Coordination of the church relocation will be necessary when setting the contract start date.

Preceding Parkway Contracts:

It would be advantageous, but not necessary, for Contract 4 Canal Control Structure to precede this contract.

3.2.7 Contract 7- Haul Road

Contract Limits: This contract includes construction of a haul road from Broad Street generally along the Parkway Alignment to the Baldwin Street Bridge.

Construction Budget: \$600,000

Notes: The northern terminus of the haul road will coincide with the access road to the former Fimbel Door site.

The haul road will generally follow the alignment of the Parkway parallel to the railroad tracks.

The road will be constructed 20 to 24 feet wide. The surface will be approximately the elevation of the Parkway sub-base. To the extent practical, the width will be measured from the proposed southerly edge of the Parkway pavement.

Temporary drainage facilities will be constructed to achieve a two-year storm event design.

Options for control of dust will be reviewed during final design.

Buried asbestos containing material will be encountered during construction. In some locations it may be decided to expand the limits of work in this contract to avoid rework of remediated areas.

Coordination with the owners of the railroad is necessary.

As design proceeds, limits of earthwork will be adjusted to assure that clean material excavated is used within project limits as embankment fill to the extent practical.

It is anticipated that wetland permitting will be needed for work in this contract.

Full and partial parcel property acquisition is needed for this contract.

Preceding Parkway Contracts:

No other Broad Street Parkway construction is needed before this work can start.

3.2.8 Contract 8- Baldwin Street Bridge & Fairmount Street Bridge

Contract Limits:

This contract includes construction of new bridges to replace existing bridges over the railroad at these two streets.

Construction Budget: \$5,700,000

Notes:

Consideration will be given to construction of this contract as a Design/Build project. Final determination may follow finalization of a Remedial Action Plan for buried asbestos material within the project limits.

Coordination with Pan Am Railroad will be necessary to define requirements for coordination related to the railroad.

Full and partial parcel property acquisition is needed for this contract.

The Baldwin Street Bridge will be constructed first and will be open to traffic prior to start of demolition of the existing Fairmount Street Bridge.

Consideration will be given to the implications of the Baldwin Street Bridge closure to Amherst Street School students who walk to school over the Baldwin Street Bridge.

Final limits of sidewalk on the approaches to both bridges will be determined during final design.

Consideration could be given to combining Contract 7-Haul Road with this contract. Total cost; right-of-way acquisition; resolution of environmental concerns; and status of contract as either design/build or design/bid/build are all factors to review.

Preceding Parkway Contracts:

Contract 7 –Haul Road must be coordinated with this contract.

3.2.9 Contract 9 River Bridge

Contract Limits:

This contract includes construction of the new bridge over the Nashua River.

Construction Budget: \$6,500,000

Notes:

Consideration could be given to construction of this contract as a design/build project. Final determination should follow finalization of a Remedial Action Plan for any hazardous material within the contract limits and property acquisition.

Coordination with Pan Am will be necessary to define requirements for coordination related to the railroad.

Partial property acquisition is needed for this contract.

This project involves impact to the Nashua River, a prime wetland.

Permitting is anticipated to take six to eight months to complete.

Because work on this contract will be concurrent with work on the Fairmount Street, access from the haul road will not be possible for most of the duration.

Access to the site from the south will be in the Millyard.

A temporary easement will be needed adjacent to the north abutment for the contractor's staging and storage area.

The area available south of the river for staging and storage will be very limited.

As presently anticipated, the contract limits do not include relocation of a city sewer interceptor and construction of a retaining wall adjacent to the river. Consideration could be given to expanding the contract limits to include this work which is presently included in the scope for Contract 10-Parkway North.

New Hampshire Department of Historic Resources has expressed concern with impacts to an existing granite block wall during construction of the south abutment. Impact to this wall will be minimized to the extent practical.

Parkway Contracts:

The following contracts must be completed prior to work on this contract:

Contract 2- Chimney Rehabilitation

Contract 3- Boiler House Demolition

3.2.10 Contract 10- Parkway North

Contract Limits:

This contract includes construction of all elements of the project north of the Nashua River not constructed under other contracts.

The work includes construction of the Parkway and appurtenant stormwater management system.

The work also includes construction of the signalized intersection at Broad Street, as well as reconstruction at the existing Broad Street rail crossing.

Construction Budget: \$8,400,000

Notes:

Full and partial property acquisition is needed for this contract.

Remediation is needed for buried asbestos containing materials at several locations in this contract.

Large retaining walls adjacent to the Nashua River are needed at two locations.

Relocation (or provisions made for protection) of a sanitary sewer interceptor adjacent to the Nashua River is required.

This project involves impact to the Nashua River, a prime wetland. Permitting is anticipated to take six to eight months to complete.

Coordination with Pan Am will be necessary to define requirements for coordination related to the railroad.

As built dimensions from Contract 7-Haul Road will lead to revisions to plans and quantities for this Contract.

Preceding Parkway Contracts:

Contract 7-Haul Road will be completed in advance of this project. The schedule for Contract 8- Baldwin Street Bridge and Fairmount Street Bridge will be coordinated with the schedule for this contract. Contract 9- River Bridge will also be coordinated with this contract.

3.2.11 Contract 11-Parkway South

Contract Limits:

This contract includes construction of all elements of the project south of the Nashua River not constructed under other contracts.

The work includes construction of the Parkway and appurtenant Stormwater Management System.

Construction Budget: \$1,700,000

Notes:

Property acquisition is needed for this contract.

Remediation for buried hazardous material may be required in this contract.

Preceding Parkway Contracts:

The following contracts must be completed prior to work on this contract:

- Contract 1- Pine Street and Palm Street
- Contract 2 - Chimney Rehabilitation
- Contract 3- Boiler Building Demolition
- Contract 4-Canal Control Structure
- Contract 5- Waste House Relocation
- Contract 6- Storehouse Number 2

In addition coordination will be necessary with Contract 9-River Bridge.

3.3 Background Information: Design/Bid/Build vs. Design/Build Contracting

Design/Bid/Build is the traditional process for contracting public construction projects. The design is advanced to the final plan stage. The design is put out to bid as a final product. The lowest responsive bidder is selected from bids received and the construction work commences.

Perhaps the greatest advantage of design/bid/build is that while not perfect, it is proven in experience. It is the project delivery system that most in-state contractors who are likely to bid on various Broad Street Parkway contracts are most familiar with. Disadvantages include the perception that it takes longer overall because of the time needed to advance the design ahead of the construction.

In design/build contracting, proposals are received from teams of contractors and designers. Proposals are solicited after the design advances to a predetermined state of design, often perhaps 30 percent. The stage that the design advances to is dependent on the type of work, as well as Owner preference.

A key is that the design advances to a point where the overall scope is generally understood and the likelihood is minimized that unforeseen conditions beyond the Contractor's control will be encountered.

A review of industry literature available from FHWA, State DOT's, Design Build Institute of America as well as many other sources indicates that the degree of success design/build contracting has had on highway and roadway projects varies greatly.

Advantages often cited for Design/Build contracting include:

- The overall time needed for project development may be reduced because construction can start before the entire design is final.
- Overall time needed for project development can also be expected to be shorter because time will not be needed for separate design and construction contract procurement.
- By introducing construction expertise into the design process, the overall quality of the project may benefit from the equivalent of ongoing value engineering.
- Overall project budgets are refined earlier in the process.
- There is single point responsibility for overall quality and functionality.

Disadvantages often cited for Design/Build Contracting include:

- Overall costs can be greater if delays occur due to environmental concerns or unresolved utility conflicts.
- Design/Build may encourage use of cheapest materials and methods.
- The traditional "checks and balances" relationship between designer and builder is transformed. The Owner may need to provide more effort in quality assurance.
- Without the traditional design process, unforeseen conditions may be encountered more frequently and the subsequent implications to schedule and budget may be more severe.
- Size of contracts and concerns about liability may limit the number of local

designers and contractors who may pursue contracts.

The possibility of using design/build procurement for all or portions of the Broad Street Parkway has been considered during a coordination effort with NHDOT and FHWA that started in 2008.

Both NHDOT and FHWA continue to compile relevant information and develop their own strategies toward use of design/build contracting. Both have committed to continuing to assist in evaluation of the merits of using this project delivery system on the Parkway project.

As discussed in the various sections of this document, there are still significant unknown factors of different types that need further investigation before a design/build contract could be entered into with reasonable confidence. These unknown factors include:

- The extent of remedial work that will be needed to address concerns with hazardous materials and subsurface contamination is unknown. It would be unreasonable to expect a design/build contractor to assume the associated risks without more information.
- A better understanding is needed of when proposed right-of-way will be acquired before a design/build contractor can commit to a schedule and budget.
- A better understanding of the required utility relocation and coordination efforts is needed before a design/build contractor can commit to a schedule and budget.
- It is suggested that the overall design in areas where Design/Build is under consideration advance to 30 percent complete before procurement of design/build services. A better understanding of project impacts and subsequent costs related to mitigation of various impacts will result.

3.3 Project Schedule

A Project Schedule (Exhibit C) has been developed based on the constraints and interrelationships of the work within the 11 potential contracts described in Section 3.2

4.0 Design Contracting

4.1 General

The work to be performed varies significantly from contract to contract as described in Section 3.2.

Subsequently, the manner in which the final design and preparation of bid and construction documents is completed will vary from contract to contract as well.

Work is presently underway on the final design for two early contracts. Hayner/Swanson, Inc. is leading a consultant team working on the final design and preparation of contract documents for Contract 1- Pine Street and Palm Street Improvements. Credere Associates is completing design and preparation of contract documents for Contract 3- Boiler House Demolition.

The City has prepared a Request for Qualifications in order to select a Final Design Consultant to complete the design of roadway construction contracts including:

- Contract 4 Canal Control Structure
- Contract 7 Haul Road
- Contract 10 Parkway North
- Contract 11 Parkway South

In addition the Final Design Consultant will assist the City by completing some early priority tasks in support of possible procurement of Design/Build services for the following contracts:

- Contract 8 Baldwin Street and Fairmount Street Bridges
- Contract 9 Nashua River Bridge

It is anticipated that the early work may include a type study for the proposed bridges as well as a review of the horizontal and vertical roadway alignments in the area of the bridges. This review will be performed in order to establish line and grade.

The City is presently reviewing advantages and disadvantages of the possible use of Design/Build contracting for these bridges. A final decision will be made at the completion of the relevant early work by the Final Design Consultant.

Should the City decide not to pursue Design/Build contracting and to follow the traditional Design/Bid/Build approach instead, the contract for the Final Design Consultant will be amended to include completion of the design for these bridges.

Other contracts involve significant work by professionals other than roadway and bridge designers and therefore procurement of design services for these contracts will be through separate means. These contracts include:

- Contract 2- Chimney Rehabilitation
- Contract 5-Waste House Relocation
- Contract 6- Storehouse Number 2

4.2 Quality Assurance

The agreement between NHDOT and the City of Nashua regarding management of the Broad Street Parkway states that NHDOT shall review the projects' engineering plans, environmental documents, and contract documents applicable to the Federal Highway and State requirements for a Federally-funded project.

During coordination meetings with NHDOT alternatives for procedures for review have been discussed, but conclusions have not been reached.

Central to forming a strategy for conducting review of plans and documents is the decision of the extent of review that will be considered appropriate.

Options vary from one extreme of reviewing all content in detail at multiple submission milestones to the opposite extreme of simply relying on the Engineer of Record (the Professional Engineer who stamps the design documents) for the design to be fully responsible for completeness and accuracy of all information presented and assuring that all proposed work is correctly designed and detailed without agency review.

It is anticipated that the recommended procedure will fall between these two extremes. Technical reviews will take the form of overviews rather than detailed checking of design and drafting.

The role that NHDOT will play remains to be defined. This role will be defined concurrent with the ongoing effort to select a Final Design Consultant and will be finalized before selection, so that the scope of work for the Final Design can be determined.

5.0 Early Action Recommendations/Early Action Priorities

The overall project schedule for the Broad Street Parkway is an aggressive schedule that requires continued early action on several priorities. It is recommended that:

- 1.) Project-wide right-of-way plans be developed based on information as presented in the Environmental Re-Evaluation.
- 2.) Coordination continue with NHDOT to finalize the scope of the City, NHDOT and FHWA in quality assurance for design and construction.
- 3.) It is recommended that supplemental ground survey be performed so that the entire base sheet is based on ground survey
- 4.) It is recommended that Final Design plans be developed in AutoCAD. This will require translation (or re-creation in AutoCAD) of the work performed during the Environmental Re-Evaluation which was prepared in MicroStation.
- 5.) An early priority for the Final Design consultant will be advancing the design to support the City's decision on whether to use Design/Build contracting for the bridges.
- 6.) Continue holding regular meetings with utility owners to track their progress in identifying and resolving utility conflicts.
- 7.) Setting as an early priority for the Final Design consultant file review and analysis needed to identify remedial steps necessary to address hazardous materials that will be encountered within project limits.
- 8.) Another early action priority relates to impacts of the project on abutters. Advance roadway design along Baldwin Street, Fairmount Street and the Millyard is needed to define project limits. Within the Millyard, this design must be developed mindful of access routes to and from the Parkway; implications of the project to existing parking capacity; access to loading docks; and the likelihood of cut-through traffic traversing private land.